CLAIMS:

1. A fuel cell system comprising:

a humidifier humidifying fuel gas and air;

a stack producing electric power by reacting the fuel gas humidified by the humidifier and the air humidified by the humidifier, including a plurality of fuel cells and fixed for free movement in a stacked direction thereof, each of the plurality of fuel cells having a polymer electrolyte membrane;

a displacement sensor detecting a displacement value in length of the stack in the stacked direction;

a temperature sensor detecting a temperature of the stack; and

a controller discriminating whether the polymer electrolyte membrane is in a dry state in response to the displacement value of the stack detected by the displacement sensor and the temperature of the stack detected by the temperature sensor, and controlling the humidifier, when the polymer electrolyte membrane is discriminated as in a dry state at a start of operation of the stack, to cause the polymer electrolyte membrane to be brought into a wet state.

2. A fuel cell system according to claim 1, wherein the controller controls the humidifier, when the polymer electrolyte membrane is discriminated as in the dry state at the start of operation, to supply the air through the humidifier to the stack for a predetermined time period while not supplying the fuel gas through the humidifier to the stack.

3. A fuel cell system according to claim 2, wherein the controller controls the humidifier, after only the air has been supplied to the stack through the humidifier for the predetermined time period, to supply the fuel gas and the air through the humidifier to the stack, while controlling the stack such that the electric power output from the stack is regulated to a limited value below a predetermined value until the polymer electrolyte membrane is determined as in

a wet state.

4. A fuel cell system according to claim 1, wherein the humidifier includes a heater heating the fuel gas and the air, and the stack produces the electric power by reacting the fuel gas humidified and heated by the humidifier and the air humidified and heated by the humidifier.

5. A fuel cell system according to claim 4, wherein the controller controls the humidifier, when the polymer electrolyte membrane is discriminated as in the dry state at the start of operation, to supply the air through the humidifier to the stack for a predetermined time period while not supplying the fuel gas through the humidifier to the stack.

6. A fuel cell system according to claim 5, wherein the controller controls the humidifier, after only the air has been supplied to the stack through the humidifier for the predetermined time period, to supply the fuel gas and the air through the humidifier to the stack, while controlling the stack such that the electric power output from the stack is regulated to a limited value below a predetermined value until the polymer electrolyte membrane is determined as in a wet state.

7. A fuel cell system according to claim 1, wherein the controller controls the humidifier to supply the fuel gas and the air through the humidifier to the stack when the polymer electrolyte membrane is discriminated as in a wet state at the start of operation of the stack.

8. A fuel cell system according to claim 7, wherein the controller controls the humidifier to supply the fuel gas and the air through the humidifier to the stack, while controlling the stack such that the electric power output from the stack is regulated to a limited value below a predetermined value until the temperature of the stack exceeds a predetermined temperature.

9. A fuel cell system comprising:

humidifying means humidifying fuel gas and air;

a stack producing electric power by reacting the fuel gas humidified by the humidifying means and the air humidified by the humidifying means, including a plurality of fuel cells and fixed for free movement in a stacked direction thereof, each of the plurality of fuel cells having a polymer electrolyte membrane;

a displacement detecting means detecting a displacement value in length of the stack in the stacked direction;

temperature detecting means detecting a temperature of the stack; and

controlling means discriminating whether the polymer electrolyte membrane is in a dry state in response to the displacement value of the stack detected by the displacement detecting means and the temperature of the stack detected by the temperature detecting means, and controlling the humidifying means, when the polymer electrolyte membrane is discriminated as in a dry state at a start of operation of the stack, to cause the polymer electrolyte membrane to be brought into a wet state.

10. A method of controlling a fuel cell system provided with a humidifier humidifying fuel gas and air, and a stack producing electric power by reacting the fuel gas humidified by the humidifier and the air humidified by the humidifier, including a plurality of fuel cells and fixed for free movement in a stacked direction thereof, each of the plurality of fuel cells having a polymer electrolyte membrane, the method comprising:

detecting a displacement value in length of the stack in the stacked direction;

detecting a temperature of the stack;

discriminating whether the polymer electrolyte membrane is in a dry state in response to the displacement value of the stack detected by the displacement sensor and the temperature of the stack detected by the temperature sensor; and

controlling the humidifier, when the polymer

electrolyte membrane is discriminated as in a dry state at a start of operation of the stack, to cause the polymer electrolyte membrane to be brought into a wet state.